REMARKS

Applicants thank the Examiner, Mr. Fitzpatrick, for his courtesy and assistance in advancing the prosecution of this application during an interview conducted July 31, 2009. As indicated in the Interview Summary, at the conclusion of the discussion, an agreement was reached that independent Claim 17, as set forth in the foregoing amendment, appears to distinguish over the cited prior art. Accordingly, because Claim 17 is the only independent claim of record, in the absence of the identification of any prior art that is more pertinent than that which is already of record, Applicants respectfully submit that this application is now in condition for allowance.

A summary of the matters discussed during the interview is set forth below, starting at page 10.

Applicants acknowledge that Claims 8-15 have been withdrawn from consideration as being directed to a non-elected invention. Accordingly, Claims 8-15 have been cancelled, without prejudice, however, to Applicants' right to resubmit them in a divisional application.

In response to the objection to the specification, a new Abstract of the Disclosure is submitted herewith, attached to this amendment on a separate sheet, as required. The new Abstract does not exceed 150 words in length.

The objection to Claim 3 has been rendered moot by the cancellation of Claims 1-7, as provided in the foregoing amendment.

Claims 1-3 and 5-7 have been rejected under 35 U.S.C. §102(b) as anticipated by Hatori (JP 07-046568), while Claim 4 has been rejected under 35 U.S.C. §103(a) as unpatentable over Hatori. These grounds of rejection have been rendered moot by the cancellation of Claims 1-7 in the foregoing amendment. Nevertheless, Applicants have submitted herewith new Claims 17-25 in place of the original Claims 1 through 7, and the following comments are submitted regarding the distinguishing features of Claims 17-25 relative to the cited Hatori reference.

The present invention is directed to an image processing camera system for a vehicle, which includes multiple systems that utilize image information obtained by the image processing camera itself. Examples of such systems are shown in Figure 2, and include, for example, a lane deviation alarm, parking assistance, collision alleviation and avoidance, etc. Each of the latter systems has its own software associated therewith, which processes information obtained from the camera for the purpose of controlling or influencing operation of the vehicle.

Ideally, each of these systems would require the same type, quality and volume of image data, acquired at the same rate, so that the image data from the

camera could be simply distributed to each of the systems, which would then process the data for its own purposes. In some video applications, in which the data are simply displayed as a "picture", this ideal situation may be realized. In practical reality, however, such compatibility generally does not exist, especially where the image data are processed not for viewing, but for subsequent vehicle control purposes. That is, each of the respective systems requires imagery obtained by the camera at a different repeat frequency, with differing volumes of data.

In particular, some of the systems may require more frequent image acquisition, and may require different amounts of time to process the differing volumes of image information. For example, a lane deviation alarm must be issued within 300 ms following a start of a lane deviation. Accordingly, the image acquisition and processing cycle for a lane deviation alarm must be 300 ms or less. Moreover, the amount of time required to process the data also varies from program to program.

While prior art systems, such as the cited Hatori publication (which is discussed in the specification of the present application) provide for the sharing of image data of a single camera amongst a plurality of applications, none of such prior art systems contains any provision for taking into account the differing amounts of processing time and processing rates for the purpose of developing a

schedule for acquiring data via the camera according to the needs of each of the respective systems, repetitively and without overlap.

As defined in new Claim 17, the present invention provides an image processing camera system for a vehicle which includes a first application program that uses image data acquired by the optical system according to a first set of camera parameters, and at a first image data acquisition rate, and performs first image processing for influencing driving of the vehicle, and at least a second application program which uses image data acquired by the optical system according to a second set of camera parameters, and at a second image data acquisition rate, and performs second image processing for influencing driving of the vehicle. Furthermore, as recited in Claim 17, the system according to the present invention includes memory locations which store information for scheduling both i) the acquisition of image data by the camera based on the first and second image data acquisition rates and the first and second sets of camera parameters and also ii) for executing processing of the first and second application programs coordinated with the acquisition of image data.

Based on the information contained in memory, an application scheduler generates instructions that provide a schedule for acquiring the image data and for executing processing of the first and second application programs, based on the schedule information, according to the progress of time. An image data pick up element controller then sets an optical system controller based on the first

and second sets of camera parameters of the first and second application programs, in response to instructions from the application scheduler. In this manner, both the setting of the optical system controller for acquiring image data from the optical system and the processing of the first and second application programs are performed according to the schedule provided by the application scheduler. (See, for example, Figure 6.)

As a result, even when the first and second application programs have restrictions in terms of processing time or a processing cycle which differ as between the applications, both the acquisition of image data and the processing according to the first and second application programs can be performed using the acquired image data, according to the instructions developed by the application scheduler.

Examples of the scheduling of image acquisition and image processing according to the present invention are provided in Figures 6, 8(a), 8(b), 9(a), 9(b), 10(a) and 10(b). Figure 6, for example, shows a schedule for image acquisition and image processing by the "intruding vehicle alarm" 301 and a "drive recorder" (imaging device) 302. As discussed in the specification starting at page 20, line 18, it can be seen that the intruding vehicle alarm 301 requires the acquisition of two images (images 1 and 2) during a single cycle (six frames), the first including a fast shutter control and the second including a second slower shutter control. The same images, however, are not suitable for the drive recorder, which must

therefore utilize a separately captured image (image 3). Moreover, the amount of time required to process the image by the drive recorder 302 processing of the data captured in the image 3 consumes six frames. Accordingly, it is possible for the two systems, intruding vehicle alarm, and drive recorder, to share the imagery obtained by the single pick up, even though entirely different data acquisition rates and processing times are necessary for the two systems, by scheduling the image acquisition and image processing as shown in Figure 6. It is noteworthy in this regard that the image acquisition as between, for example, image 1 for the intruding vehicle alarm, and image 3 for the drive recorder cannot overlap (the camera settings being different). However, it is possible for the processing of each of the respective systems to be performed concurrently, albeit, at different timing within the overall image cycle.

To summarize, the present invention provides a system which controls the operation of the image acquisition camera, taking into account not only the image requirements of the respective applications, but also the data acquisition rates and amount of processing time required for the respective applications to process the data for their intended purposes. For this purpose, a memory is provided which stores information regarding not only camera settings but data acquisition and processing rates for the respective applications.

By way of contrast, the Hatori reference contains no provision for carrying out scheduling, taking into account differing data acquisition rates and

processing requirements of the respective application programs, as is recited in independent Claim 17. Rather, in Hatori, successive image requests (specified only in terms of camera angle, lens opening and shutter speed) from applications 44-1 to 44-3 are stored in a "history attaching part", which functions in the manner of a data buffer. The demand controller 52 receives the requests and causes the camera operator 50 to acquire the images in accordance with the stored requests (in terms of camera angle, lens opening and shutter speed). When a particular image request from a particular application has been satisfied (that is, acquisition of the image as requested has been completed), the application issues a "termination" command, and the demand controller accordingly modifies the "history".

"Time sharing" of subsisting image acquisition requests is provided for whenever the specified parameters (in terms of camera angle, lens opening and shutter speed) of two image requests from two applications differ by less than a predetermined amount. (See machine translation, paragraph [0026], and Figure 16.) The overall operation of the apparatus is summarized in paragraphs [0021] through [0026], followed by four examples of requests submitted by different applications.

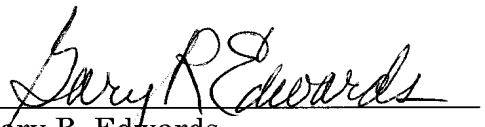
The Hatori publication, however, contains no discussion which suggests taking into account the differing data acquisition rates, data volume and processing times, as provided in the present invention as defined in Claim 17.

Accordingly, Applicants respectfully submit that Claim 17 distinguishes over Hatori.

In light of the foregoing remarks, this application should be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket # 056208.57288US).

Respectfully submitted,



Gary R. Edwards
Registration No. 31,824

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
GRE:kms
8625656_1